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PRELIMINARY REPORT

FOR THE DEVELOPMENT OF

A SOIL AND WATER CONSERVATION PROGRAM

in the

WASHINGTON SOIL CONSERVATION DISTRICT

of

OREGON

Prepared For

THE WASHINGTON SOIL CONSERVATION DISTRICT

By

U. S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

JULY 1955

WAHINGTON SCD PRELIMINARY REPORT

CONTENTS

I. LOCATION AND DESCRIPTION OF DISTRICT

The Washington S. C. D. is located in Washington County, Oregon, and is an area of approximately 207,290 acres. The district includes all of Washington County south of the following described line: Start of Northwest corner of Sect. 3 - TIN - R 5W thence East 3 miles to Northeast corner of the township, thence South 6 miles to Baseline, thence East on Baseline to Hillsboro, thence South and East on Highway 6 to the Washington-Multnomah County line. The District is approximately the south half of Washington County and is bound on the North by North Washington County, on the East by Multnomah County, on the Southeast by a small portion of Clackamas County, on the South by the Yamhill County SCD and on the West by the North Tillamook SCD.

The District is drained by the Tualatin River and its tributaries except for about one-half a township by Trask River and about one section by Wilson River drainage in the extreme West end of the District and about two sections by Willamette River drainage in the extreme Southeast corner.

Principal tributaries to the Taulatin in the District are Scoggins Creek in the Western area, and the outlets and small portions of the lower ends of Gales Creek, Dairy Creek and Dawson Creek along the Northern edge of the District.

Larger towns in the District are Forest Grove, Cornelius, Hillsboro, Beaverton, Gaston, Tigard and Sherwood. Portland city limits are just about a mile East of the District and this proximity is widely reflected in the marketing and development of the District.

The enclosed map (Exhibit I) locates the District in respect to the State a nd in relation to Counties and Soil Conservation Districts which it borders.

II. CLIMATIC INFORMATION

The climate of the Washington SCD is determined primarily by its location within the zone of the prevailing westerly winds and its proximity to the Pacific Ocean. Generally, the winters are mild and wet and the summers relatively dry and warm. Most of the precipitation occurs as rain, even in the higher elevations. Temperatures throughout the year are generally mild with only an occasional daily mean below freezing during the winter. Likewise, there are only a
days a year when the temperature will exceed 90° F.

Climatalogical data are published for three stations in the district, Dilley, Forest Grove and Hillsboro. A complete Weather Bureau station is also adjacent to the District at Portland.

The normal annual precipiation is about 50 inches, varying from 36 inches at Beaverton to 90 inches at the western edge of the district. Over 60 percent of this is recorded in four months, November through February, with December the wettest month. Storms producing 5 to 10 inches of rain in 3 to 7 days are an annual occurrence. Less than 10 percent of the annual precipitation is recorded in the four summer months, June through September, with July the driest month.

Annual snowfall varies from 10 inches in the valley to 4 feet in the mountains but remains on the ground for only a short period.

The mean annual temperature of the valley floor is 52° with a recorded maximum of 108° F and minimum of -18° F at Forest Grove. In a normal winter there are 27 days in which the temperature falls below the freezing point, but on only 4 days does it remain below throughout the day. About 7 days a year normally experience temperatures above 90° F.

III. LAND OWNERSHIP

The approximate proportion under various kinds of ownership are shown below:

	Privately Owned	Publicly Owned				Total Public	Total Lands
		Dept. Int.	State	County	Municipal		
Percent of Dist	85%	2%	11%	.3%	1.7%	15%	100%
Acres	*174,700	4,500	23,000	600	3,500	31,600	207290**

* This figure includes 29,000 acres of larger timber holding.

** Includes 12,290 acres of miscellaneous non-agricultural land in all ownerships and not herein segregated.

Land ownership map is shown on Map (Exhibit II)

IV. LAND USE

A. Estimated present use of land in the District is as follows:

1. Land in farms - 136,000 acres.

a. Cropland - 73,000 acres, of which about 10,000 is used for pasture.

b. Pasture land - 42,000 acres non-rotation pastures.

c. Woodland - 21,000 acres of land are classified as woodland.

2. Timber lands - 29,000 acres are in large corporate timber holdings, and 30,000 acres are publicly owned.

3. Miscellaneous lands - 12,290 acres are in lands now being used for non-agricultural uses, such as roads, industrial, homes, etc.

V. GEOLOGY AND TOPOGRAPHY

The district has a valley floor through the central and northern portions, and has low mountains along its western, southern and eastern boundaries. The Coast Range Mountains on the west range up to 3,000 feet in elevation. They are composed of narrow valleys and steep ridges and are formed predominently from old volcanic flows with sedimentary shales forming the lower hills. A spur of the Coast Range, Chehalem and Parrott mountains ranging in elevation between 1,000 and 2,000 feet, is found along the southern part of the district. These mountains generally have long moderate to strong slopes and ridges with occasional steep areas, and are composed of Columbia River basalt with intermingled older weathered basic igneous rock and occasional sedimentary shale areas. Bull and Cooper mountains are located in the eastern part of the district, and are similar in both geology and topography to Parrott and Chehalem mountains. The valley floor has two main divisions, the old valley fill material of mixed origin that forms the nearly level valley floor, and the recent alluvial material of mixed origin that forms the floodplains or bottomlands.

VI. SOIL AND LAND CONDITIONS

The soils are found in three general locations: the uplands, the valley floor, and the bottomlands.

The residual upland soils have formed either over basic igneous rock or sedimentary shale and sandstone. The reddish brown soils have formed over basic igneous rock, and the yellowish brown soils have formed over sedimentary rock. Small areas of reddish brown soils

and dark gray soils that contain dense clay subsoils have also formed over sedimentary rock and will be intermingled with the yellowish brown soils. All of these soils will have wide range in slope and depth to limiting layers. The long moderate to strongly sloping north slopes of Parrott and Chehalem mountains have predominantly a yellowish brown soil which forms a deep mantle over the underlying reddish brown residual soil. The gently to moderately sloping footslope soils will be predominantly a deep grayish brown.

The valley floor soils vary in their internal drainage from droughty to poorly drained. Small areas of a droughty yellowish brown soil that is underlain at shallow depths by porous sandy material occurs on the southeastern portion of the valley floor. The moderately well and well drained brown and yellowish brown soils occupy most of the valley floor area. Intermingled with these are the dark grayish brown imperfectly drained mottled soils and the gray and dark gray poorly drained mottled soils that have either a dense clay or fragipan subsoil. These restrictive clay and fragipan subsoils may be shallow or moderately deep.

The bottomland soils occur along all of the streams and occupy floodplains that vary in width from a few yards up to 2 miles. They have a wide range in texture and drainage, and are generally subject to river overflow. The yellowish brown well drained soils are located adjacent to the larger streams. The dark grayish brown mottled imperfectly drained soils are located along the smaller streams and in the lower lying areas adjacent to the well drained soils. The very dark gray and gray poorly drained soils occupy the low-lying back bottom areas. They are heavy textured, mottled and contain shallow to moderately deep dense claypan subsoils. Small areas of peat and muck are intermingled with the poorly drained soils, and usually occupy the low depressions.

VII. CONSERVATION PROBLEMS AND TREATMENTS

The conservation problems and treatments in the district have been listed according to the three major areas: the uplands, the valley floor, and the bottomlands. The upland areas have been divided into three divisions: the very steep land that is not suitable for cultivation, the moderately steep land that is suitable for cultivation, often with major limitations, and the footslopes that are suitable for cultivation generally with minor limitations. The valley floor has been divided into four divisions: the well drained land with only minor limitations if any, the imperfectly drained land that requires some form of drainage and has moderate soil limitations, the poorly drained land that has both major drainage problems and major soil limitations, and the droughty land that is low in available

water holding capacity. All of the bottomland is generally subject to occasional to frequent river overflow and has been divided into four divisions: the peat and muck land, the well drained land that requires some form of drainage and has moderate soil limitations, and the poorly drained land that has both major drainage problems and major soil limitations.

The problems and their treatments have been listed in the outline below for each of the divisions in the three physiographic areas.

Upland

1. Very steep

   A. Problem

      Erosion or potential erosion

   B. Treatment

      (1) Establish and maintain suitable cover.

      (2) Protect crop and pasture land below from excessive runoff.

2. Moderately steep

   A. Problems

      (1) Erosion

      (2) Soil fertility

      (3) Scattered wet areas

      (4) Droughty areas

   B. Treatment

      (1) Contour operations - contour planting, strip cropping, contour tillage

      (2) Diversions and outlets

      (3) Winter cover - cover crops or residues

      (4) Fertility and soil structure improvement - green manure, rotations, fertilizers

      (5) Random drainage

      (6) Irrigation

3. Footslopes

A. Problems

(1) Erosion

(2) Fertility

(3) Excessive wetness

B. Treatment

(1) Cross slope operations - planting and tillage

(2) Winter cover

(3) Fertility and soil structure improvement

(4) Diversions and outlets

(4) Drainage where needed

Valley Floor

1. Well drained

A. Problems

Erosion on minor areas

B. Treatment

Winter cover on erodable areas

2. Imperfectly drained

A. Problems

(1) Winter and early spring wetness

(2) Leaching

(3) Poor structure

B. Treatment

(1) Drainage

(2) Fertilizers and amendments

(3) Addition of organic matter

3. Poorly drained

A. Problems

(1) Excessive wetness

(2) Restrictive profile

(3) Poor Structure

(4) Leaching

B. Treatments

(1) Drainage where feasible

(2) Use of perennial sod crops

(3) Subsoiling where applicable

(4) Fertilizers a nd soil amendments

(5) Addition of organic matter

4. Droughty

A. Problems

(1) Low available water holding capacity in profile

(2) Leaching of plant foods

B. Treatment

(1) Irrigation

(2) Addition of organic matter

(3) Fertilizers

Bottomlands

1. Peat and muck

A. Problems

(1) Water table

(2) Fertility

(3) Fire hazard

(4) Subsidence

B. Treatment

(1) Control of water table

(2) Supplemental irrigation

(3) Fertilizers and soil amendments

(4) Fire control measures

(5) Limited cultivation in subsidence

2. Well drained

A. Problems

(1) River overflow

a. Deposition

b. Field erosion

c. Weeds

d. Crop limitations

e. Crop and property damage

f. Leaching of plant food

(2) Streambank erosion

B. Treatment

(1) Diking and channel improvement

(2) Watershed treatment and flood water storage

(3) Streambank protection

(4) Winter cover crops

3. Imperfectly drained

A. Problems

(1) River overflow

a. Deposition

b. Field erosion

c. Weeds

d. Crop limitations

e. Crop and property damage

f. Leaching of plant food.

(2) Streambank erosion

(3) Wetness

B. Treatment

(1) Diking and channel improvement

(2) Watershed treatment and flood water storage

(3) Streambank protection

(4) Winter cover crops

(5) Drainage

4. Poorly drained

A. Problems

(1) River overflow

a. Deposition

b. Field erosion

c. Weeds

d. Crop limitations

e. Crop and property damage

f. Leaching of plant food

(2) Streambank erosion

(3) Wetness

(4) Restrictive profile

B. Treatment

(1) Diking and channel improvement

(2) Watershed treatment and flood water storage

(3) Streambank protection

(4) Winter cover crops

(5) Drainage

(6) Use of perennial sod crops

VIII. OTHER PROGRAM RECOMMENDATIONS

A. Irrigation

Irrigation has been practiced to a limited extent for some 30 years but has been expanding at an accelerating rate during the past 10 or 12 years. To date applications have been filed for water rights to irrigate something like 10,000 acres of land. It has been estimated by the State Engineer's office that water available in the streams of the district during summer is only sufficient to adequately irrigate about 4,000 acres. The average actually being irrigated is somewhat less than this figure since not all streams are being completely utilized although existing water rights exceed the available low flow for most streams.

1. Streamflow

Most of the irrigation water of the district is taken from streamflow. However, oversubscription of water rights has brought about a condition where further irrigation must come from other sources. Since the summer of 1952 the situation has become so serious that a watermaster has been appointed by the State Engineer to enforce the use of water according to priority of established rights. In addition, the power plant at the lower end of Oswego Lake has a very old water right for a 750 cfs diversion from the Tualatin River, but has been virtually forced to accept down to as low as 10 cfs during the late summer because of the over-use of irrigation water.

2. Groundwater

Pumping from wells for irrigation is generally not practicable because groundwater supplies are inadequate. One area from Farmington to Laurel has been fairly successful in pumping from low pressure artesian wells. Other wells have been dug throughout the district, but in general, have had poor results. This confirms the findings of the U. S. Geological Survey in an early study of groundwater resources in the area.

3. Storage Development

A great deal of interest has been shown in the past few years in the use of reservoirs for storage of winter flow. More than enough winter runoff water flows out of the district each year than is necessary to irrigate all the irrigable lands. The chief problem is the location of sites to store the runoff water for irrigation. A number of sites are available for use but even with maximum development there will still be insufficient water for all the land available for irrigation. The Corps of Engineers has prepared a proposal for several dams on the upper Tualatin River to store water for irrigation as well as for flood control and domestic use. As yet these proposals have not been accepted.

B. Cropland Fertility Improvement

The improvement of fertility on lands devoted to crop production is one of the more important keys to an effective conservation program in the district. It is on the cropland where the most severe erosion losses and depletion of soil fertility occur.

Most of the cropland in the district is yielding much below its potential. This is especially true on the hill lands and on land that can be improved by drainage. Yields are lowest on fields which have been farmed annually in a one crop system, where clean cultivation is continuous, and where soil cover, the maintenance of organic matter and the addition of needed mineral elements have not been adequately considered and provided for.

A good soil management program should be adapted to fit each type of cropland which will meet the soil improvement and conservation needs. Such a program should provide for:

1. Adequate winter cover protection.

2. A crop rotation adapted to each type of land that will include soil building grass-legume sod crops, return needed organic matter, provide for need, insect and disease control, and restore soil life, tilth and structure.

3. The application of needed mineral supplements, to correct soil deficiencies and to replace those elements removed by harvested crops and annual leaching.

4. The best soil improvement program is one that is adapted to the individual farm. It is a program that not only meets the needs of the land but also the needs of the farm enterprise. The soil improvement and erosion control requirements of a cropland program should be adjusted in accordance with the degree of land development and the intensity of its use.

5. There are limited areas of the steeper cropland in which an adjustment to less intensive cultivated use should be made, to prevent excessive erosion losses. At the same time much of the good bottomland can be further developed to a more intensive use.

C. Pasture Management

The development and improvement of pasture land in the district can be a very important part of the district program. Many pastures are of the native un-improved type. Production can be increased many times through clearing, land preparation, seeding to high producing grasses and legumes, grazing management, applying needed fertilizers, drainage and by irrigation where water can be made available. Good pastures can do much to provide the needed soil building crops in crop rotation and contribute to the soil building program in general. The growing of livestock on good pasture also promotes the production of feed and hay crops needed in a conservation program. The fertility produced through barnyard manure represents a saving in the cost of commercial fertilizer and higher yields on cash crops produced. There are two land conditions on which pasture or hay production should be the primary use. They include the steeper hill lands and the wet lands which cannot be fully drained. High producing pastures can be grown on these lands when adapted plants for the site are established, fertilizers are applied, a rotation grazing system is employed and the wet lands are drained to the degree feasible.

D. Woodland Management

Since nearly one-third of the area of the district is in woodland or is primarily adapted to the growing trees as a crop, the woodland phase of the district should receive a good deal of attention. Some land in the district is adapted only to the growing of trees. Much of this is within the Tillamook burn. These areas occur on very steep slopes or have shallow soils and should be restocked, protected and managed in a permanent tree cover. This is important not only because trees are the best economic use of such land, but tree cover is necessary to preserve the land, and for watershed protection. Tree cover is also important to conserve water on the watershed and to reduce flood damage on areas below.

A number of wooded areas also occur throughout the district which occupy land suitable for other uses. Where good stands occur, serious consideration should be given to the continued use and management of these in a crop of trees. Economic considerations and the need for clearing the land should be fully explored. These good timber producing sites can produce a high yield of timber products when properly harvested and managed according to the needs of the stand, site, and age of growth.

In order to develop an interest among woodland owners, to preserve and manage trees as a crop, it is important that they be furnished with facts about growing trees and the returns they can expect from their woods. The following program is suggested:

1. Determine by a soil survey the areas of the district that should be used for growing trees.

2. Determine the productivity and management requirements for each timber site in the district.

3. Give each owner of woodland, as a part of the farm plan, the facts about his woods, its management needs and production potential. This is of special importance where alternate uses are possible, and a conversion to other use may have been considered.

4. Establish woodland management demonstrations in the district to show woodland owners what can be done to produce maximum tree crop yields, over an extended period of harvesting and management.

5. Help woodland owners with harvesting methods and with marketing their products for maximum returns.

E. Fish and Wildlife

Too often little thought is given to the importance of wildlife to conservation. It can be a program in which the farmer, as well as the hunter and fisherman, benefit.

Wildlife is automatically benefited when a good land use and conservation program is applied on the land. Beneficial farm and game birds can be materially increased on the farm and in the community when special effort is given to their protection and the development of necessary food and cover.

Farm ponds can produce fish as a farm product. Farm ponds and other open water will greatly benefit waterfowl.

Wildlife agencies and organizations are interested in cooperating with Soil Conservation Districts. Assistance from such agencies and organizations can be of considerable value to the conservation program in the district.

F. Cooperative Action

Effective solution to some of the problems will need cooperative action of groups of land owners and operators. The size of the group that will have to work together will depend on the particular problem involved. It may be expected to vary from two or three individual or small projects to possibly a hundred or more individuals on some of the major overflow problems.

The size of the group having a common interest in a problem has a very great bearing on the way it should be organized to work effectively. Past experience has shown that projects directly involving not more than six or eight individuals may be effectively handled by a very informal type of organization. In such cases the plans for the complete job is worked out and each individual signs the agreement with the district for his part of the job. For groups involving as many as twenty to twenty-five individuals a more formalized organization is usually necessary to successfully carry out a project. A voluntary association has been successful in a good many such cases. Such an organization has its by-laws and elected officers who are authorized to represent the group in much of the work during planning and installation of the project. However, the authority of the association representatives does not include power to obligate the group for the expenditure of money or to handle legal

titles to rights-of-way, etc. Such matters have to be agreed to by the individual members of the association the same as for the less formally organized small groups. Thus, for complex jobs or those involving a considerable number of individuals even this type of organization is too unwieldy to be effective. The projects directly involving more than about twenty individuals, and for many smaller groups, it is most essential that the group be organized in a legally recognized body. Only in such an organization will the group representatives have the authority (to act in behalf of the group) that is necessary to plan, construct and operate a complex project or one that involves a large number of individuals.